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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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26361	7590	07/14/2005	EXAMINER	
STEPHEN H. CAGLE HOWREY, SIMON, ARNOLD & WHITE, LLP 750 BERING DRIVE HOUSTON, TX 77057			RIDLEY, BASIA ANNA	
			ART UNIT	PAPER NUMBER
			1764	

DATE MAILED: 07/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/006,879

Applicant(s)

DESHPANDE ET AL.

Examiner

Basia Ridley



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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 April 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) 15-28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 March 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 051402,071902,072902
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Invention I, claims 1-14 in the reply filed on 22 April 2005 is acknowledged. The traversal is on the ground(s) that the method and apparatus are not distinct, because the apparatus claim recites a water shift reactor and selective oxidation reactor, therefore the process practiced by said apparatus is not materially different from the process recited in the method claims. This is not found persuasive because the specific operating conditions do not constitute positive limitation in the apparatus claim, therefore the apparatus as recited in the apparatus claims can be used to perform the process which does not require specific reaction conditions as recited in the method claims.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 15-28 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected Invention, there being no allowable generic or linking claim.

Information Disclosure Statement

3. The following documents, 6238815, 5997594, 5874051, 5132007, 6086839, 5248566, 4976747, 4522894, 4363654, cited in the information disclosure statement filed on 19 July 2002 have been already submitted and considered as part of the information disclosure statement filed on 14 May 2002.

Priority

4. It is noted that this application appears to claim subject matter disclosed in prior Application No. 60/251,226, filed 5 December 2000. A reference to the prior application must be inserted as the first sentence(s) of the specification of this application or in an application data sheet (37 CFR

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1.76), if applicant intends to rely on the filing date of the prior application under 35 U.S.C. 119(e) or 120. See 37 CFR 1.78(a). For benefit claims under 35 U.S.C. 120, the reference must include the relationship (i.e., continuation, divisional, or continuation-in-part) of all nonprovisional applications. Also, the current status of all nonprovisional parent applications referenced should be included.

If the application is a utility or plant application filed under 35 U.S.C. 111(a) on or after November 29, 2000, the specific reference to the prior application must be submitted during the pendency of the application and within the later of four months from the actual filing date of the application or sixteen months from the filing date of the prior application. If the application is a utility or plant application which entered the national stage from an international application filed on or after November 29, 2000, after compliance with 35 U.S.C. 371, the specific reference must be submitted during the pendency of the application and within the later of four months from the date on which the national stage commenced under 35 U.S.C. 371(b) or (f) or sixteen months from the filing date of the prior application. See 37 CFR 1.78(a)(2)(ii) and (a)(5)(ii). This time period is not extendable and a failure to submit the reference required by 35 U.S.C. 119(e) and/or 120, where applicable, within this time period is considered a waiver of any benefit of such prior application(s) under 35 U.S.C. 119(e), 120, 121 and 365(c). A benefit claim filed after the required time period may be accepted if it is accompanied by a grantable petition to accept an unintentionally delayed benefit claim under 35 U.S.C. 119(e), 120, 121 and 365(c). The petition must be accompanied by (1) the reference required by 35 U.S.C. 120 or 119(e) and 37 CFR 1.78(a)(2) or (a)(5) to the prior application (unless previously submitted), (2) a surcharge under 37 CFR 1.17(t), and (3) a statement that the entire delay between the date the claim was due under 37 CFR 1.78(a)(2) or (a)(5) and the date the claim was filed was unintentional. The Director may require additional information where

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there is a question whether the delay was unintentional. The petition should be addressed to: Mail Stop Petition, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Specification

5. The abstract is objected to because it is too long.

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

6. The disclosure is objected to because of the following informalities:

- inconsistent numbering of elements: e.g. "Process step A" or "autothermal reforming step A" (see P4/L29, P6/L2, P6/L16, P10/L31-P11/L1) and "air A" (see P10/L20, P11/L16);
- inconsistent numbering of elements: e.g. "feed stream F" (see P4/L31, P6/L7, P10/L5, P10/L9, P10/L10) and "process stem F" (see P8/L7, P8/L13);
- "a hydrogen rich gas" on P9/L13 should be amended to --a hydrogen rich gas P--;
- apparent inconsistency: "Reactor 202 (...) operates as described in process step C of Figure 1" (P10/L15-16) and "desulfurization reactor 207, which corresponds to process step C of Figure 1" (P11/L8-9);
- "presence eof" on P14/L26 should be replaced with --presence of--.

Appropriate correction is required. Applicant is reminded that no new matter shall be added.

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7. The use of the trademarks Inconel, Incoloy and Hastelloy has been noted in this application (see P9/L29). It should be capitalized wherever it appears and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

Drawings

8. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:

- "100" see P9/L20;
- "101" see P10/L9
- "203" see P10/L21, P10/L22 and P12/L6;
- "102" see P10/L24;
- "207" see P11/L8;
- "214" see P11/L30 and P12/L3.

9. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: "V" (see Fig. 2).

10. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because the following reference characters have been used to designate more than one detail:

- "F" has been used to designate both, feed stream (in Fig. 1 and 2) and a process step (in Fig. 1);
- "A" has been used to designate both, air streams (in Fig. 2) and a process step (in Fig. 1);
- "204" has been used to designate both, a reactor component (in Fig. 2) and a spiral heat exchanger (in Fig. 2).

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11. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. Claims 1-2 and 4-7 are rejected under 35 U.S.C. 102(b) as being anticipated by McShea, III et al. (USP 4,863,707).

Regarding claims 1-2 and 4-7, McShea, III et al. discloses the apparatus comprising:

- a manifold (16) for mixing the hydrocarbon fuel with an oxygen containing gas to give a fuel mixture;
- an autothermal reformer (42) including a catalyst;
- a water gas shift reactor (58) including a catalyst;
- a selective oxidation reactor (70) including a catalyst to produce hydrogen rich gas;
- further comprising a heat exchanger (14) for heating a hydrocarbon fuel into a heated

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hydrocarbon fuel;

- a heat exchanger (16) for heating the fuel mixture to produce a heated fuel mixture
- further comprising a desulfurization reactor (54) including a catalyst for reacting the hydrogen containing gaseous mixture before said mixture is fed to the water gas shift reactor;
- wherein the hydrocarbon fuel is selected from the group consisting of natural gas, methane, ethane, propane, butane, LPG, naphtha, gasoline, kerosene, diesel, methanol, ethanol, propanol, and combinations thereof (C1/L15-29).

Regarding limitations recited in claims 1-2 and 4-7 which are directed to a manner of operating disclosed system, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. Claims 3 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over McShea, III et al. (USP 4,863,707) in view of Preston, Jr. (USP 4,190,641).

Regarding claim 3, McShea, III et al. discloses all of the claim limitations as set forth above. Additionally, the reference discloses that the steam reforming catalyst comprises nickel (C13/L15-19), and the hydrocarbon fuel can contain sulfur compounds (C1/L15-29), but the reference does not disclose that said sulfur compounds should be removed from the hydrocarbon fuel before said hydrocarbon fuel comes in contact with the steam reforming catalyst.

Preston, Jr. teaches that steam reforming catalysts comprising nickel are deactivated by sulfur compounds in hydrocarbon feed and that said sulfur compounds should be converted into hydrogen sulfide in a hydrodesulfurizer before coming in contact with said nickel catalyst. Later in the process, said hydrogen sulfide should be removed from the process stream, before said process stream comes in contact with the shift catalyst (C1/L29-C2/L8).

It would have been obvious to one having ordinary skill in the art at the time of the invention to add a hydrodesulfurizer before the hydrocarbon fuel comes in contact with the steam reforming catalyst of McShea, III et al., as taught by Preston, Jr., for the purpose of protecting said steam reforming catalyst from deactivation.

Regarding limitations recited in claim 3 which are directed to a manner of operating disclosed system, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

Regarding claims 10-12, McShea, III et al. discloses the apparatus comprising:

- a first heat exchanger (14) for heating a hydrocarbon fuel into a heated hydrocarbon fuel;

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- a manifold (16) for mixing the hydrocarbon fuel with an oxygen containing gas to give a fuel mixture;
- a second heat exchanger (16) for heating the fuel mixture to produce a heated fuel mixture
- an autothermal reformer (42) including a catalyst;
- a second desulfurizer reactor (54);
- a water gas shift reactor (58) including a catalyst;
- a selective oxidation reactor (70) including a catalyst to produce hydrogen rich gas;
- wherein the hydrocarbon fuel is selected from the group consisting of natural gas, methane, ethane, propane, butane, LPG, naphtha, gasoline, kerosene, diesel, methanol, ethanol, propanol, and combinations thereof (C1/L15-29).

Additionally, the reference discloses that the steam reforming catalyst comprises nickel (C13/L15-19), and the hydrocarbon fuel can contain sulfur compounds (C1/L15-29), but the reference does not disclose that said sulfur compounds should be removed from the hydrocarbon fuel before said hydrocarbon fuel comes in contact with the steam reforming catalyst.

With respect to Preston, Jr. the same comments apply as set forth above.

Regarding limitations recited in claims 10-12 which are directed to a manner of operating disclosed system, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

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16. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over McShea, III et al. (USP 4,863,707) in view of Hwang et al. (USP 4,522,894) and further in view of Epp et al. (USP 6,063,515).

Regarding claims 8-9, McShea, III et al. discloses all of the claim limitations as set forth above. Additionally, the reference discloses that the apparatus produces hydrogen gas which can be used for ammonia production, but does not disclose any other use for said gas (abstract).

Hwang et al. teaches another use for hydrogen gas generated by autothermal reforming of hydrocarbon fuels, such as in a fuel cell to produce electricity (abstract). Further, the reference teaches integrated apparatus wherein the apparatus efficiency is increased by using unconverted hydrogen gas from fuel cell anode exhaust, the apparatus comprising:

- an anode tail gas oxidizer (24) for reacting the unconverted hydrogen from a fuel cell under oxidation conditions to create hot anode tail gas oxidizer effluent;
- wherein the hot anode tail gas oxidizer effluent is heat integrated with the apparatus (Fig. 2).

It would have been obvious to one having ordinary skill in the art at the time of the invention to use the hydrogen gas produced by the apparatus of McShea, III et al., in the fuel cell of Hwang et al., as doing so would require merely a combination of two known systems. A system is not patentable where said system is an obvious combination of two known systems, absent showing unexpected results.

While Hwang et al. discloses the anode tail gas oxidizer (24) and the reference discloses that catalytic anode tail gas oxidizers are known in the art (C3/L1-12), the reference does not explicitly disclose said burner (24) including a catalyst. As catalytic burners are safer as compared to flame burners, and since they resulting more complete combustion of the reactants and are more readily controlled (as evidenced by Epp et al., C3/L18-22), It would have been obvious to one having

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ordinary skill in the art at the time of the invention to use catalyst in the anode tail gas oxidizer of McShea, III et al. in view of Hwang et al. for the purpose of improving operation and efficiency by increasing safety and controllability of the burner and improving completeness of reaction.

Regarding limitations recited in claims 8-9 which are directed to a manner of operating disclosed system, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

17. Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over McShea, III et al. (USP 4,863,707) in view of Preston, Jr. (USP 4,190,641), in view of Hwang et al. (USP 4,522,894) and further in view of Epp et al. (USP 6,063,515).

Regarding claims 13-14, McShea, III et al. in view of Preston, Jr. disclose all of the claim limitations as set forth above. Additionally, McShea, III et al. discloses that the apparatus produces hydrogen gas which can be used for ammonia production, but does not disclose any other use for said gas (abstract).

With respect to Hwang et al. and Epp et al. the same comments apply as set forth above.

Regarding limitations recited in claims 13-14 which are directed to a manner of operating disclosed system, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states

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“Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim.”

18. Claims 1-4 and 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buswell et al. (USP 5,360,679) in view of Werth (USP 5,840,270).

Regarding claims 1-4 and 6-7, Buswell et al. discloses the apparatus comprising:

- a reformer (168) including a catalyst;
- a water gas shift reactor (176) including a catalyst;
- a selective oxidation reactor (142) including a catalyst to produce hydrogen rich gas;
- further comprising a heat exchanger (152);
- further comprising a desulfurization reactor (158) including a catalyst;
- further comprising a heat exchanger (164);
- wherein the hydrocarbon fuel is selected from the group consisting of natural gas, methane, ethane, propane, butane, LPG, naphtha, gasoline, kerosene, diesel, methanol, ethanol, propanol, and combinations thereof (C2/L39-41).

Buswell et al. does not disclose said reformer being autothermal reformer, and a manifold for mixing an oxygen containing gas with the hydrocarbon fuel.

As autothermal reformers are known to improve efficiency of steam reformers and POX reactors by increasing hydrogen production efficiency over POX reactors and improving heat efficiency over steam reformers (see Werth, C7/L45-60), it would have been obvious to one having ordinary skill in the art at the time of the invention to replace the steam reformer of Buswell et al. with the autothermal reformer, as taught by Werth, for the purpose of optimizing hydrogen production and heat efficiencies.

Regarding limitations recited in claims 1-4 and 6-7 which are directed to a manner of

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operating disclosed system, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

19. Claims 5 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buswell et al. (USP 5,360,679) in view of Werth (USP 5,840,270) and further in view of Preston, Jr. (USP 4,190,641).

Regarding claim 5, Buswell et al. in view of Werth disclose all of the claim limitations as set forth above. Additionally, Buswell et al. discloses that the desulfurization bed (158) comprises hydrodesulfurizer (C2/L39-C3/L2), but the reference does not disclose that the hydrogen sulfide generated in said process is removed before coming in contact with shift catalyst.

Preston, Jr. teaches that steam reforming catalysts comprising nickel are deactivated by sulfur compounds in hydrocarbon feed and that said sulfur compounds should be converted into hydrogen sulfide in a hydrodesulfurizer before coming in contact with said nickel catalyst. Latter in the process, said hydrogen sulfide should be removed from the process stream, before said process stream comes in contact with the shift catalyst (C1/L29-C2/L8).

It would have been obvious to one having ordinary skill in the art at the time of the invention to add a second desulfurizer for reacting the hydrogen containing gaseous mixture before said mixture is fed to the water gas shift reactor Buswell et al., as taught by Preston, Jr., for the purpose of protecting said shift catalyst.

Regarding limitations recited in claim 5 which are directed to a manner of operating

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disclosed system, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states “Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim.”

Regarding claims 10-12, Buswell et al. discloses the apparatus comprising:

- a first heat exchanger (152) for heating a hydrocarbon fuel into a heated hydrocarbon fuel;
- a first desulfurization reactor (158) including a catalyst for reacting the heated hydrocarbon fuel to produce substantially desulfurized hydrocarbon fuel;
- a second heat exchanger (164) for heating the fuel mixture to produce a heated fuel mixture
- a reformer (168) including a catalyst;
- a water gas shift reactor (176) including a catalyst;
- a selective oxidation reactor (142) including a catalyst to produce hydrogen rich gas;
- wherein the hydrocarbon fuel is selected from the group consisting of natural gas, methane, ethane, propane, butane, LPG, naphtha, gasoline, kerosene, diesel, methanol, ethanol, propanol, and combinations thereof (C2/L39-41).

Buswell et al. does not disclose said reformer being autothermal reformer, and a manifold for mixing an oxygen containing gas with the hydrocarbon fuel.

With respect to Werth the same comments apply as set forth above.

Additionally, Buswell et al. discloses that the desulfurization bed (158) comprises hydrodesulfurizer (C2/L39-C3/L2), but the reference does not disclose that the hydrogen sulfide generated in said process is removed before coming in contact with shift catalyst.

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With respect to Preston, Jr. the same comments apply as set forth above.

Regarding limitations recited in claims 10-12 which are directed to a manner of operating disclosed system, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

20. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buswell et al. (USP 5,360,679) in view of Werth (USP 5,840,270) and further in view of Epp et al. (USP 6,063,515).

Regarding claims 8-9, Buswell et al. in view of Werth discloses all of the claim limitations as set forth above. Additionally, the Buswell et al. discloses the apparatus comprising an anode tail gas oxidizer (29) for reacting the unconverted hydrogen from a fuel cell under oxidation conditions to create hot anode tail gas oxidizer effluent, wherein the hot anode tail gas oxidizer effluent is heat integrated with the apparatus (Fig. 1), but the reference does not explicitly disclose said burner (294) including a catalyst. As catalytic burners are safer as compared to flame burners, and since they resulting more complete combustion of the reactants and are more readily controlled (as evidenced by Epp et al., C3/L18-22), It would have been obvious to one having ordinary skill in the art at the time of the invention to use catalyst in the anode tail gas oxidizer of Buswell et al. for the purpose of improving operation and efficiency by increasing safety and controllability of the burner and improving completeness of reaction.

Regarding limitations recited in claims 8-9 which are directed to a manner of operating

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disclosed system, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states “Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim.”

21. Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buswell et al. (USP 5,360,679) in view of Werth (USP 5,840,270), in view of Preston, Jr. (USP 4,190,641) and further in view of Epp et al. (USP 6,063,515).

Regarding claims 13-14, Buswell et al. in view of Werth and further in view of Preston, Jr. disclose all of the claim limitations as set forth above. Additionally, the Buswell et al. discloses the apparatus comprising an anode tail gas oxidizer (29) for reacting the unconverted hydrogen from a fuel cell under oxidation conditions to create hot anode tail gas oxidizer effluent, wherein the hot anode tail gas oxidizer effluent is heat integrated with the apparatus (Fig. 1), but the reference does not explicitly disclose said burner (294) including a catalyst.

With respect to Epp et al. the same comments apply as set forth above.

22. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

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Conclusion

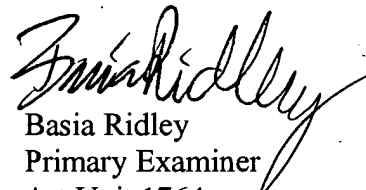
23. In view of the foregoing, none of the claims are allowed.

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Basia Ridley, whose telephone number is (571) 272-1453.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola, can be reached on (571) 272-1444.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Technical Center 1700 General Information Telephone No. is (571) 272-1700. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Questions on access to the Private PAIR system should be directed to the Electronic Business Center (EBC) at (866) 217-9197 (toll-free).


Basia Ridley
Primary Examiner
Art Unit 1764

BR

July 11, 2005